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Role of Cu in exchange bias in FeMn revealed with neutron scattering[1] IGOR V. ROSHCHIN, PAVEL N. LAPA, Texas A&M Univ., ARTUR GLAVIC, HAILE AMBAYE, VALERIA LAUTER, Oak Ridge National Lab., SUNGKYUN PARK, Pusan National U., TATIANA EGGERS, U. South Florida, CASEY W. MILLER, U. South Florida, Rochester Inst. of Technology — We observed an unusual behavior: a non-magnetic material, copper, modifies magnetic properties of antiferromagnetic FeMn in close proximity. Copper is responsible for the "*intrinsic*" exchange bias (EB) observed in a multilayered system without a distinct, separate ferromagnetic (FM) layer: Ta(5 nm)/[FeMn(5-45 nm)/Cu(5 nm)]$_{10}$/Ta(5 nm) [1]. This EB occurs between pinned and unpinned uncompensated magnetization (UM) in the FeMn layers. The analysis of the remanent magnetization (M_R) shows that the unpinned (ferromagnet-like) UM is distributed uniformly throughout FeMn [1]. Since the magnitude of the EB loop shift (H_E) scales with the inverse thickness of the FeMn layer, this EB is clearly an interfacial phenomena. This behavior is similar to that described by Malozemoff's model for the bilayer (antiferromagnet-ferromagnet) EB systems [2]. Thus, the pinned UM should be located near the FeMn interface. Results of polarized neutron reflectometry that explain the role of Cu in the unusual magnetism in these FeMn/Cu multilayers will be presented.

[1] D. Kaya *et al.*, J. Appl. Phys., **113**, 17D717 (2013).
[2] A.P. Malozemoff, Phys. Rev. B **35**, 3679 (1987), *ibid.*, **37**, 7673 (1988).

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